

WHAT IS CLAIMED:

1. A process for hydrocracking a hydrocarbonaceous feedstock which process comprises:

(a) passing a hydrocarbonaceous feedstock, a liquid recycle stream and hydrogen to a hydrocracking zone containing hydrocracking catalyst;

(b) partially condensing the effluent from said hydrocracking zone to produce a hydrogen-rich gaseous stream and a first liquid hydrocarbonaceous stream;

(c) introducing at least a portion of said first liquid hydrocarbonaceous stream comprising hydrocarbons boiling at a temperature below the boiling range of said hydrocarbonaceous feedstock, hydrocarbons boiling at a temperature in the boiling range of said hydrocarbonaceous feedstock and heavy polynuclear aromatic compounds into a first zone of a divided-wall fractionation zone to produce at least one liquid hydrocarbonaceous product stream and a second liquid hydrocarbonaceous stream comprising hydrocarbons boiling at a temperature in the boiling range of said hydrocarbonaceous feedstock and heavy polynuclear aromatic compounds;

(d) reintroducing at least a portion of said second liquid hydrocarbonaceous stream into a second zone located in the bottom end of said divided-wall fractionation zone to produce a third hydrocarbonaceous stream rich in polynuclear aromatic compounds;

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(e) recycling at least another portion of said second liquid hydrocarbonaceous stream to said hydrocracking zone to provide at least a portion of said liquid recycle stream; and

(f) recovering said liquid hydrocarbonaceous product stream.

10 2. The process of Claim 1 wherein said hydrocracking zone is operated at conditions including a temperature from about 400°F to about 900°F, a pressure from about 500 psig to about 2500 psig and a liquid hourly space velocity of said hydrocarbonaceous feedstock from about 0.1 hr<sup>-1</sup> to about 15 hr<sup>-1</sup>.

15 3. The process of Claim 1 wherein said hydrocarbonaceous feedstock boils in the range from about 450°F to about 1050°F.

4. The process of Claim 1 wherein said hydrocracking zone is operated at a conversion per pass in the range from 15% to about 60%.

5. The process of Claim 1 wherein said third hydrocarbonaceous stream rich in polynuclear aromatic compounds is less than about 1 weight percent of said hydrocarbonaceous feedstock.

6. A process for hydrocracking a hydrocarbonaceous feedstock which process comprises:

(a) passing a hydrocarbonaceous feedstock, a liquid recycle stream and hydrogen to a hydrocracking zone containing a hydrocracking catalyst and recovering a hydrocracking zone effluent therefrom;

(b) partially condensing the hydrocracking zone effluent to produce a hydrogen-rich gaseous stream and a first liquid hydrocarbonaceous stream;

(c) passing the first liquid hydrocarbonaceous stream to a flashing zone having a reduced pressure to produce a first gaseous stream comprising hydrogen and normally gaseous hydrocarbons and a second liquid hydrocarbonaceous stream;

(d) stripping the second liquid hydrocarbonaceous stream to produce a second gaseous stream comprising normally gaseous hydrocarbons and a third liquid hydrocarbonaceous stream comprising hydrocarbons boiling at a temperature below the

boiling range of the hydrocarbonaceous feedstock,  
hydrocarbons boiling at a temperature in the boiling range of the  
hydrocarbonaceous feedstock and heavy polynuclear aromatic  
compounds;

5 (e) fractionating the third liquid hydrocarbonaceous stream in a first  
zone of a divided-wall fractionation zone to produce at least one  
liquid hydrocarbonaceous product stream and a fourth liquid  
hydrocarbonaceous stream comprising hydrocarbons boiling at a  
temperature in the boiling range of the hydrocarbonaceous  
10 feedstock and heavy polynuclear aromatic compounds;

(f) reintroducing at least a portion of the fourth liquid  
hydrocarbonaceous stream into a second zone located in the  
bottom end of the divided-wall fractionation zone to produce a  
fifth hydrocarbonaceous stream rich in polynuclear aromatic  
15 compounds;

(g) recycling at least another portion of the fourth liquid  
hydrocarbonaceous stream to the hydrocracking zone to provide  
at least a portion of the liquid recycle stream; and

(h) recovering the liquid hydrocarbonaceous product stream.